

WHAT IS CLAIMED IS:

1. A sheet stacking apparatus comprising:

a first tray on which sheets discharged from an outlet are stacked, said first tray being movable  
5 between a stacking position at which the sheets discharged from the outlet are stacked and a first retracted position above the staking position;

a second tray on which the sheets discharged from the outlet are stacked, said second tray being  
10 disposed below said first tray and being movable independently of said first tray, said second tray being movable between the stacking position and a second retracted position below the stacking position; and

15 a controller that causes said second tray to descend when the sheets are to be stacked on said first tray, said controller causing said second tray to stop descending when said second tray reaches a standby position where a distance between the outlet  
20 and a top surface of the sheets stacked on said second tray is a predetermined distance.

2. The sheet stacking apparatus according to Claim 1, further comprising a sensor that detects the  
25 sheets on said second tray when said second tray is at the standby position;

wherein said controller causes said second tray

to initiate descending movement and then to stop the descending movement just before an output of said sensor changes from "sheet present" to "sheet absent".

5     3.     The sheet stacking apparatus according to Claim  
2, wherein when said second tray is at the standby  
position, said controller causes said second tray to  
ascend in response to a change of the output of said  
sensor from "sheet present" to "sheet absent," and to  
10   stop ascending in response to a change of the output  
of said sensor from "sheet absent" to "sheet present".

4.     The sheet stacking apparatus according to Claim  
2, wherein when said second tray is descending toward  
15   the standby position, said controller causes said  
second tray to stop regardless of the output of said  
sensor.

5.     The sheet stacking apparatus according to Claim  
20   2, wherein when said second tray is descending toward  
the standby position, said controller causes said  
second tray to ascend in response to a change of the  
output of said sensor from "sheet present" to "sheet  
absent," and to stop ascending in response to a  
25   change of the output of said sensor from "sheet  
absent" to "sheet present".

6. The sheet stacking apparatus according to Claim 1, further comprising a second sensor that detects that said second tray has descended to reach a lower limit when said second tray is caused to descend to  
5 stack sheets onto said first tray,

wherein when said second tray is descending toward the standby position, said controller causes said second tray to stop descending in response to the detection that said second tray has reached the  
10 lower limit.

7. A sheet post-handling apparatus having a plurality of stack trays disposed vertically onto which sheets discharged from an outlet are stacked,  
15 the apparatus comprising:

a plurality of drive devices which drive respective stack trays to ascend and descend;

a sheet surface detecting device disposed below the outlet, said sheet surface detecting device  
20 detecting a top surface of a stack tray, a top surface of the sheets, or a stack of sheets on the stack tray;

height controlling means that controls said drive device to move the stack tray to its stacking  
25 position in such a way that the top surface detected by said sheet surface detecting device is below the outlet;

retracted position detecting means which when another stack tray moves from above so that the top surface may be detected by said sheet surface detecting device, detects the stack tray or the sheet  
5 on the stack tray at a retracted position where movement of the stack tray to the stacking position is not interfered, the retracted position being lower than the stacking position;

movement distance detecting means that detects  
10 a movement distance of the stack tray driven by the drive device to the retracted position; and

retraction controlling means that causes a stack tray to stop when said movement distance detecting means has detected that the stack tray has  
15 moved from the stacking position already obtained to a position where either the stack tray or the sheets on the stack tray is detected by said retracted position detecting means.

20 8. A sheet post-handling apparatus having a plurality of stack trays disposed vertically onto which sheets discharged from an outlet are stacked, the apparatus comprising:

a plurality of drive devices which drive  
25 respective stack trays to ascend and descend;

a sheet surface detecting device disposed below the outlet, said sheet surface detecting device

detecting a top surface of a stack tray, a top surface of the sheets, or a stack of sheets on the stack tray;

height controlling means that controls said  
5 drive device to move the stack tray to its stacking position in such a way that the top surface detected by said sheet surface detecting device is below the outlet;

retracted position detecting means which when  
10 another stack tray moves from above so that the top surface may be detected by said sheet surface detecting device, detects the stack tray or the sheet on the stack tray at a retracted position where movement of the stack tray to the stacking position  
15 is not interfered, the retracted position being lower than the stacking position;

time measuring means that measures time; and  
retraction controlling means that causes a stack tray to stop when said time measuring means has  
20 detected that the stack tray has moved for a time period calculated based on a distance from the stacking position already obtained to a position where said retracted position detecting means detects the stack tray or sheets on the stack tray, and a  
25 speed of the stack tray moving to the retracted position.

9. A sheet post-handling apparatus having a plurality of stack trays disposed vertically onto which sheets discharged from an outlet are stacked, the apparatus comprising:

5 a plurality of drive devices which drive respective stack trays to ascend and descend;

a sheet surface detecting device disposed below the outlet, said sheet surface detecting device detecting a top surface of a stack tray, a top  
10 surface of the sheets, or a stack of sheets on the stack tray;

height controlling means that controls said drive device to move the stack tray to its stacking position in such a way that the top surface detected  
15 by said sheet surface detecting device is below the outlet;

retracted position detecting means which when another stack tray moves from above so that the top surface may be detected by said sheet surface  
20 detecting device, detects the stack tray or the sheet on the stack tray at a retracted position where movement of the stack tray to the stacking position is not interfered, the retracted position being lower than the stacking position;

25 movement distance detecting means that detects a movement distance of the stack tray driven by the drive device to the retracted position;

retraction controlling means that causes a stack tray to stop when said movement distance detecting means has detected that the stack tray has moved from the stacking position already obtained to  
5 a position where either the top surface of the stack tray or the top surface of the sheets on the stack tray is positioned below and detected by said retracted position detecting means.

10 10. A sheet post-handling apparatus having a plurality of stack trays disposed vertically onto which sheets discharged from an outlet are stacked, the apparatus comprising:

a plurality of drive devices which drive  
15 respective stack trays to ascend and descend;  
a sheet surface detecting device disposed below the outlet, said sheet surface detecting device detecting a top surface of a stack tray, a top surface of the sheets, or a stack of sheets on the  
20 stack tray;

height controlling means that controls said drive device to move the stack tray to its stacking position in such a way that the top surface detected by said sheet surface detecting device is below the  
25 outlet;

retracted position detecting means which when another stack tray moves from above so that the top

surface may be detected by said sheet surface  
detecting device, detects the stack tray or the sheet  
on the stack tray at a retracted position where  
movement of the stack tray to the stacking position  
5 is not interfered, the retracted position being lower  
than the stacking position;

time measuring means that measures time; and

retraction controlling means that causes a  
stack tray to stop when said time measuring means has  
10 detected that the stack tray has moved for a time  
period calculated based on a distance from the  
stacking position already obtained to a position  
where either the top surface of the stack tray or the  
top surface of the sheets on the stack tray is  
15 positioned below and detected by said retracted  
position detecting means.

11. The apparatus according to Claim 7, further  
comprising a lower limit detecting means that detects  
20 a lower limit of a stack tray;

wherein when the stack tray is moving toward  
the retracted position, if said a lower limit  
detecting means detects the lower limit, the stack  
tray is controlled to stop.

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12. The apparatus according to Claim 11, further  
comprising a pre-lower-limit detecting means,



disposed between said lower limit detecting means and said retracted position detecting means, for detecting that the stack tray moves to a position close to the lower limit,

5            wherein when said pre-lower-limit detecting means detects that the stack tray has moved to the position close to the lower limit, if said sheet surface detecting means detects that either the top surface of the stack tray or the top surface of  
10 sheets on the stack tray has been moved to a position lower than a position that said retracted position detecting means can detect, the stack tray is controlled to stop moving.

15    13.    The apparatus according to Claim 7, further comprising ascending movement controlling means for controlling said drive device to cause the stack tray to ascend to a position where said retracted position detecting means can detect either the top surface of  
20 the stack tray or the top surface of the sheets on the stack tray,

          when after the stack tray has moved to the retracted position and has stopped, if said retracted position detecting means detects that either the top  
25 surface of the stack tray or the top surface of the sheets on the stack tray is below a position where said retracted position detecting means can detect.

14. The apparatus according to Claim 13, wherein if  
said ascending movement controlling means does not  
complete ascending movement of the stack tray within  
a predetermined time period for ascending movement,  
5 the ascending movement of the stack tray is  
controlled to be terminated.

15. The apparatus according to Claim 7, further  
comprising job-initiation controlling means that  
10 controls the stack tray to move to a predetermined  
stop position.